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ABSTRACT

This study investigated the feasibility of structured, programmed practice with tape-recorded materials and its effect upon the performance achievement of beginning elementary cornet and trumpet students. The main purpose of the study was to facilitate the teaching and learning in instrumental performance through the application of programmed procedure to individual practice. The central hypothesis was that structured practice with recorded tapes containing programmed material would produce a significant difference in performance achievement as compared with unstructured, non-programmed practice. The experimental population consisted of 52 fifth-grade male beginning cornet and trumpet students. The experimental treatment consisted of structured daily practice with ten weekly 20-minute tapes containing programmed material. The control method consisted of daily 20-minute practice of the same material, out in a non-structured manner without tapes. Two-way analysis of variance, t-test, and correlation were the statistical procedures used in testing the hypothesis. The .05 level of significance was adopted as the criterion for accepting or rejecting the hypothesis. Programmed practice was found to be significantly superior to non-programmed practice as evidenced in performance achievement. The .01 level of confidence was achieved. (Author/CK)

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Final Report

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THE DEVELOPMENT AND EXPERIMENTAL APPLICATION OF SELF-INSTRUCTIONAL PRACTICE MATERIALS FOR BEGINNING INSTRUMENTALISTS

Vito Puopolo
Alcorn A. and M. College
Lorman, Mississippi

July 1970

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SUMMARY

This study investigated the feasibility of structured, programed practice with tape-recorded materials and its effect upon the performance achievement of beginning elementary cornet and trumpet students. The main purpose of the study was to facilitate the teaching and learning of instrumental performance through the application of programed procedure to individual practice. Specific purposes were: (1) to determine the effect of programed practice upon performance achievement, (2) to determine the relationships of music achievement, social status, and I.Q. with both programed practice and performance achievement.

The main hypothesis was that structured practice with recorded tapes containing programed material would produce a significant difference in performance achievement as compared with unstructured, non-programed practice. In addition to the main hypothesis, the study examined: (1) interactions between programed practice and each independent variable, (music achievement, social status, and I.Q.) with respect to cornet performance achievement, and (2) the relationship of performance achievement (independent variable) to music achievement, social status, and I.Q.

The experimental population consisted of fifty-two fifth grade male beginning cornet and trumpet students drawn from six elementary schools in Baton Rouge, Louisiana. Subjects were equated on the basis of music achievement as measured by the Elementary Music Achievement Test, social status as determined by the Warner Scale of Social Status, and I.Q. measured by the Otis Quick-Scoring Beta Test for Grades 4-9.

The experimental treatment consisted of structured daily practice with ten weekly twenty-minute tapes containing programed material. The control method consisted of daily twenty-minute practice of the same material, but in a non-structured manner without tapes. The effects of each mode of practice upon cornet performance achievement were measured by the Watkins-Farnum Performance Scale. Two-way analysis of variance, t-test, and correlation were the statistical procedures used in testing the hypotheses. The .05 level of significance was adopted as the criterion for accepting or rejecting the hypotheses.

Programed practice was found to be significantly superior to non-programed practice as evidenced in performance achievement. The .01 level of confidence was achieved. Of the control group, students of above-average prior music achievement exhibited significantly greater cornet performance achievement than those of below-average prior music achievement. Of the experimental group, no

significant difference in cornet performance achievement was found between students of above-average and below-average prior music achievement. There was no significant difference in cornet performance achievement between students of above-average and below-average social status, with or without programed practice. Of the control group, no significant difference in cornet performance achievement existed between above-average I.Q. students and those of below-average I.Q. However, in the experimental group, below-average I.Q. students showed significantly greater cornet performance achievement than those of above-average I.Q.

No significant interaction existed between music achievement and programed practice, or social status and programed practice. A significant interaction existed between I.Q. and programed practice in terms of cornet performance achievement. This interaction seemed to account for the fact that a significant positive correlation existed within the control group between I.Q. and cornet performance achievement while a non-significant negative correlation between the two varibles existed within the experimental group.

I. INTRODUCTION

Background of the Study

Learning pertaining to the study of a musical instrument can be classified according to three major areas: (1) knowledges, (2) skills, and (3) attitudes. Though attitudes and values are considered to be learned, they are not taught. However, teachers are aware of the necessity of attitudes to motivation, therefore, through personal interaction with students, consciously influence attitudinal development. Knowledges and skills leading to improvement of instrumental music performance are the two kinds of learning actually taught.

During the private or class lesson, the teacher communicates to the pupil the concept of a particular knowledge or skill. This he does either verbally or via his own music skill through demonstration. In either case, what is transmitted to the pupil is verbal or demonstrative description. The pupil attains a knowledge as he experiences its concept; in many cases this may be almost instantaneous. Acquiring music skill, which may or may not begin with the concomitant concept, requires learning to continue beyond concept. It must take place in the actual execution. Though at first far from perfect, execution, after much practice, may come to coincide with concept. The practice intervening between the concept of a skill and its ultimate execution was a main concern of this study.

In his private or class lesson, which consists of less than ten percent of time devoted to instrumental study, the child receives appraisal, correction, and new concepts. Then for the remaining ninety percent of study time, he must actually teach himself the performance skills, and motor patterns needed to execute the concepts learned in his lessons. Consequently, the application of concepts and development of skills are dependent upon a child's limited capacity for patience, self-discipline, self-assessment, perseverance, and thoroughness. He may:

1. Practice too fast, sacrificing accuracy for speed.
2. Spend most of the time practicing that which he can already do well and avoid that which is difficult.
3. Repeat material over and over without detecting or correcting mistakes.
4. Not remember a music concept correctly, thus practice it incorrectly.
5. Not know how to approach a particular problem by himself.

The toll of such a faculty practice procedure is high. Musical growth is interrupted, even stunted, and valuable lesson time must be devoted to remedial work. In class situations, some who are ready for advancement must suffer boredom and frustration while waiting for bad habits and misconcepts of others to be corrected. In some instances these bad habits in performance, once formed, are never completely eliminated.

The Problem

The central problem was to adapt and evaluate programed instruction as a procedure for increasing the efficiency of individual practice. The level of efficiency desired was that which would be significantly evident in the acquisition of knowledges and skills necessary for instrumental music performance.

Significance of the Problem

It was a premise of this study that penetration of the problem of individual instrumental practice would provide insight which could advance the efficiency of teaching as well as individual practice, upgrade performance, and elevate standards for future consumers of music.

Purpose and Objectives

The main purpose of this study was to facilitate the teaching and learning of instrumental performance through the application of programed procedure to individual practice. Specific objectives were:

1. To develop assigned material into self-instructional practice material on recorded tape.

2. To test the feasibility of structured practice with this material in learning concepts and developing skills for performance on a musical instrument.

3. To determine the relationships between performance achievement and each of the following: (1) music achievement, (2) social status, (3) I.Q.

4. To determine the effect of music achievement, social status, and I.Q. upon programed practice with respect to performance achievement.

Hypotheses

The main hypothesis of this study was that structured practice with recorded tapes containing programed material would produce a significant difference in performance achievement as compared with non-structured, non-programed practice.

Investigation of the main hypothesis necessitated examination of the following null hypotheses:

1. There would be no significant difference in performance achievement between students of above-average prior music achievement and those of below-average prior music achievement.

2. There would be no significant interaction between music achievement and programed practice with respect to performance achievement.

3. There would be no significant difference in performance achievement between students of above-average social status and those of below-average social status.

4. There would be no significant interaction between social status and programed practice with respect to performance achievement.

5. There would be no significant difference in performance achievement between students of above-average I.Q. and those of below-average I.Q.

6. There would be no significant interaction between I.Q. and programed practice with respect to performance achievement.

Scope of the Study

This study dealt mainly with the effect of programed practice upon the performance achievement of fifty-two fifth grade beginning trumpet and cornet students. Music achievement, social status, and I.Q. were studied for effect upon performance achievement and interaction with programed practice.

Practice material was the weekly lesson as assigned in band class. Experimental and control groups were comprised of all fifth grade beginning trumpet and cornet students from six elementary schools at East Baton Rouge Parish, Louisiana: Magnolia Woods Elementary School, River Oaks Elementary School, Villa del Rey Elementary School, Red Oaks Elementary School, Audubon Elementary School, and Broadmoor Elementary School.

Limitations of the Study

Music achievement, social status, and I.Q. were examined insomuch as they are thought to relate to music performance achievement. For purposes of delimitation, the experiment was restricted to trumpet and cornet students. It must be recognized, however, that the programed format which was employed, and the findings which resulted may be applicable to practice on any musical instrument.

1. Sex of Subjects. There were no female fifth grade trumpet or cornet students from any of the participating schools. Therefore, sex was not a factor.

2. Practice Material. The weekly assigned material for individual practice by the subjects was the weekly lesson exactly as assigned by the instrumental music teacher in band class. Except for the programed format, all explanations and demonstrations included on the experimental tapes reflected exactly the methods and philosophy of the instrumental music teacher. This study was not concerned with the effectiveness of particular method books used, manner or style of teaching, or order of presentation of new concepts. Programing of the material was in strict accordance with the teaching principles, styles and philosophy already being practiced in the music department of the East Baton Rouge Parish Public Schools.

3. Length of Time. The experiment commenced on March 3, 1969 and continued for ten weeks, excluding Easter vacation. Practice material included only the concepts and skills being taught in the band class.

4. Embouchure. Detection and correction of personal embouchure problems occurred during band class. The experimental tapes included explanations of correct embouchure as it related to the exercises and tunes being practiced.

5. Tone Quality. Tone quality was not specifically dealt with in the experimental tapes. Subjects were constantly urged to practice with the finest tone possible. Tone quality was not included in the evaluation of performance achievement.

6. Pitch. Intonation was not specifically dealt with in the experimental tapes. It was expected, however, that the activity of listening and imitating would help develop intonation. Evaluation of performance achievement did not include measurement of intonation.

Definition of Terms

It is appropriate that certain terms be defined, and for the purpose of this study, should be used with that particular concept in mind.

1. Music achievement is musical ability as measured by the Colwell Music Achievement Test which included three areas; (1) pitch discrimination, (2) interval discrimination, (3) meter discrimination.

2. Performance achievement is the ability to perform on a musical instrument (trumpet and cornet) as measured by the Watkins-Farnum Performance Scale which provides for measures of errors in pitch, tempo, length of note, expression, slurs, rests, pauses, and repeats.

3. Social status is socio-economic level according to the Warner Scale of Socio-Economic Status. Three categories were used: (1) occupation of parent, (2) outward appearance of home, (3) neighborhood.

4. Monitoring is defined as the supervision of the scheduled practice of each subject by a responsible adult.

5. Programing of practice is the arrangement of practice material to a step-by-step format of problem solving, and drill of performance skills and concepts. Each drill consists of three basic stages: (1) model performance, (2) response, (3) reinforcement.

6. Model performance is the presentation of the piece, exercise, or isolated segment by the recorded trumpet, accompanied by a piano and narrator. The model trumpet performances were of a nearly professional musical quality, recorded by a college trumpet student. The narrator provides counting of the meter as well as explanations when necessary.

7. Response is the stage when the subject, after hearing the model, performs the same material, very slowly at first and gradually increasing tempo with each repetition until "a tempo" is reached. The student's response is accompanied by the piano and directed by the narrator.

8. Reinforcement is the stage following response; it is a final model performance with which the student compares his response. The student can compare by listening or playing in unison with the recorded model.

9. Structured practice is defined as practice time which has been systematically planned beforehand by the teacher; problematic sections are given more attention.

10. Unstructured practice is not planned. As he practices, the student decides how the alloted time is to be apportioned.

II. Related Research

At Ohio State University, Spohn (1959)[1] experimented with structured drill material in the development of melodic perception. A main objective of the investigation was the comparison of structured extra-class drill to unstructured extra-class drill. The material was kept in musical context. Results indicated that strutured self-drill was significantly more effective.

Spohn (1960)[2] programed basic materials for self-instructional development of aural skills. The drill material consisted of melodic ascending intervals which were presented in order from easy to difficult. The evaluation ascertained that interval recognition could be significantly improved through programed self-instruction.

Carlsen (1962)[3] compared programed aural training with teacher-instruction. The experimental group was subgrouped to allow a comparison of linear programing technique with branching. Findings disclosed evidence of significantly greater effectiveness of programed self-instruction over teacher-instruction in the development of aural perception. No significant differences between the two techniques of programed instruction were detected.

Sidnell (1968)[4] experimented with programed training tapes as a means of improving score reading skill of student instrumental conductors at Michigan State University. A linear program format consisting of four listening frames was used in error detection and identification exercises. A control group used tapes of the same exercises in a non-programed format. Results showed programed drill to be significantly superior to non-programed drill in improving score reading skill. It was concluded that a greater learning level and more substantial gain were produced with the use of programed drill material.

Kanable (1969)[5] compared programed self-instruction with class instruction in the development of sight-singing skill. After only twelve days of treatment, a post-test was given. Results showed no significant difference between programed individual instruction and classroom instruction.

La Bach (1965)[6] conducted a pilot study experimenting with programed training in the specific area of instrumental practice. He constructed a device consisting of a two-track tape recorder, speaker, microphone, and several power relay switches and controls. The device was designed so that students could record their practice of a given exercise, hear it played back, then compare it with the playback of a pre-recorded model of the same exercise. The feasibility of the practice device was successfully demonstrated. Though a controlled statistical evaluation of student progress was not attempted, La Bach was able to conclude: (1) students preferred practicing with the

device, (2) performance skills could be significantly improved through the use of the device.

At Pennsylvania State University, Deihl and Radocy (1969)[7] investigated computer-assisted instrumental instruction. The procedure included two separate stages: first, the listening program; second, the playing program. After demonstrating satisfactory aural discrimination at the computerized station, the student participates in the off-the-line program. The playing program consists of practice with a device functionally identical to the La Bach device. Findings have not yet been made known at this writing.

The writer (1967)[8] conducted a pilot study at Michigan State University investigating the effects of structured individual instrumental practice with recorded tapes. Recorder was the instrument used in the study. Method and material were identical for both experimental and control groups. Mode of practice was the only difference; for control group it was unstructured, for experimental group it was structured and programed on tape. Results indicated structured practice with recorded tapes to significantly affect the learning of musical concepts and skills evidenced in musical performance.

The writer (1968)[9] conducted a second pilot study with beginning cornet and trumpet students at Lucy Jefferson Junior High School in Vicksburg, Mississippi. Negative learning was found to be a factor distinctly affecting growth. Certain members of the control group achieved lower scores on the post-test than the pre-test. The regression was due to obvious bad habits acquired after the pre-test. A gain was experienced by every member of the experimental group.

Pinkerton (1963)[10] attempted to determine what criteria were being used in the selection of students for public school instrumental programs. A survey of one hundred and fifty cities throughout the United States revealed student interest and recommendations of teachers to be the most popular criteria. A particular interest of the present study was the weight given to prior music achievement and I.Q. ratings. Over sixty-two percent of the respondents used music achievement tests for rough screening, grouping, and elimination from the instrumental program. Over forty-two percent of the respondents used I.Q. ratings as a criteria for selection of students.

The present study found level of prior music achievement to have no bearing upon performance achievement of students using the programed mode of practice. Students of below-average I.Q. actually exhibited greater performance achievement than those of above average I.Q. Both prior music achievement and I.Q. had a direct bearing upon the performance achievement of students not using the programed mode of practice.

Research by Porter (1958)[11] which dealt with programed teaching of spelling to elementary school children is, nevertheless, pertinent to the present research. Twenty two weeks of spelling instruction were

given at the sixth grade level. Experimental groups were taught via teaching machine and control groups were taught in the usual manner. Some statistical results of the study were paralleled quite closely in the present study. As shown in Table I, essentially no relationship exists between I.Q. scores and achievement in the experimental groups, while a significant positive relationship exists in the control groups.

Table I. Correlations Between I.Q. and Achievement

	Experimental Group	Control Group
Porter Study - I.Q. and Spelling Achievement	-.128 (n.s.)	+.343 (.05)
Present Study - I.Q. and Performance Achievement	-.182 (n.s.)	+.385 (.05)

III. METHOD

Procedures

The experimental population was comprised of fifty-two fifth grade male students in their first year of cornet or trumpet study. Subjects were drawn from six elementary schools in which band class was taught by the same teacher. The weekly band class assignment constituted the individual practice material. Practice occurred each school day during lunch hour, recess, or after school for a period of ten weeks.

The practice of each subject was carefully monitored by the music teacher, classroom teachers, and college practice-teaching students. Monitoring responsibilities included keeping attendance and certifying that each subject practiced the required time per scheduled session. Monitors also arranged for make-up practice sessions necessitated by absences, so at the post-test date, each subject had completed the same amount of practice time on each assignment.

For the experimental group, each weekly lesson was programed and recorded on tape for self-instruction. Each programed lesson was recorded on a seven-inch reel master tape at a speed of seven and one-half inches per second, then reproduced on cassette copies, one to each experimental group member. The casette players, when not in use, were left in the care of homeroom teachers. The student was required to bring his player, in which was inserted that week's cassette, his instrument and music each time he reported for daily individual practice. All individual practice activity was directed entirely from the tape recording.

The control group practiced the same material under identical conditions except for the programed tapes. The length of each practice session was matched to the duration of the experimental practice tape for that given week. The experimental tapes were from twenty to twenty-five minutes in duration, varying from week to week.

Description of the Program

In the preparation of the experimental tapes, the investigator worked closely with the instrumental music instructor and exercised great care in maintaining consistency with her methods and terminology. The tapes were subjected to evaluation by a panel of experts headed by Dr. Robert G. Sidnell, Chairman of Music Education, Michigan State University.

Each tape included:

1 Model cornet performance of all material.

2. Simple piano accompaniment for all model performances, responses and reinforcements.

3. Verbal instructions, explanations, and counting of meter during occurrence of all model performances, responses and reinforcements.

The following format (See Appendix A for an excerpt from the script of a practice tape.) was generally adhered to:

1. A brief reminder of problems to be encountered preceded each tune or exercise to be practiced. (new rhythms, new notes, fingerings, chromatics, new note value, phrasings, etc.)

2. Student listened to model performance of tune or exercise while reading along from the score.

3. While reading from the score, student listened to first isolated segment.

4. Student played segment very slowly, then slightly faster, faster, and finally "a tempo" (Directed by recorded counting and piano accompaniment.)

5. Student was asked if he remembered to cope with specific problems, for example, "Did you remember to use the second valve for that F# on the third beat?"

6. Student listened to reinforcement and compared.

7. After each segment was drilled, student performed entire tune or exercise, then listened to reinforcement. (According to recorded instructions, student either listened to reinforcement or played in unison with it.)

Method of Gathering Data

Subjects were pre-tested in three behaviors which served as the independent variables: (1) music achievement, (2) social status, (3) I.Q. Music achievement was measured by the Music Achievement Test One;[12] social status was determined by the Warner Scale of Social Status;[13] I.Q. was determined on the basis of the Otis Quick-Scoring Beta Test[14] scores obtained from school records. Scores from the three pre-tests were dichotomized at the mean.

Subjects were placed in experimental or control group by a "flip-of-the-coin" method. Table II is a diagram of the resultant experimental design.

Table II. Experimental Design for the Study

	Experimental (with tapes)	Control (without tapes)
Music Achiev.	Above-Average	Above-Average
	Below-Average	Below-Average
Social Status	Above-Average	Above-Average
	Below-Average	Below-Average
I.Q.	Above-Average	Above-Average
	Below-Average	Below-Average

Upon completion of ten weeks of practice, the post-test, the Watkins-Farnum Performance Scale,[15] was administered in a room equipped with a tape recorder, metronome, chair, and music stand containing the appropriate test items. Tape recordings containing each subject's name and post-test performance were sent to the scorer. Having no knowledge of which subjects belonged to experimental or control group, the scorer was able to maintain complete objectivity.

Performance achievement scores within each of the three major groups, (music achievement, social status, I.Q.) underwent a two-way analysis of variance treatment. Significant F statistics were further investigated by means of the t-test and correlation treatment. The five percent level of confidence was accepted as the standard for the significance of the F, t, and r statistics.

Description of the Data Gathering Instruments

The Beta Test for Grades 4-9 by Arthur S. Otis consists of eighty items, including word meaning, verbal analogies, scrambled sentences, interpretation of proverbs, logical reasoning, number series,

arithmetic reasoning, and design analogies. One score summarizes the eighty items. The coefficients as quoted average .91 and the standard error is four points.

The Watkins-Farnum Performance Scale by John G. Watkins and Stephen Farnum is a series of musical exercises of increasing difficulty presented for instrumental sight reading. The level of performance is determined by the number of errors made. Any error in a bar of music cancels the one point for that bar. Factors of music performance evaluated are pitch, length of note, tempo, expression, slurs, rests, pauses, and repeats. The student is stopped when he fails to score in two consecutive exercises. Metronome markings are indicated for each exercise. Reliability coefficients are from .87 to .94. Validity coefficients based on correlation with instructor ratings range from .68 to .87.

The Elementary Music Achievement Test by Richard Colwell contains three subtests: (1) pitch discrimination, (2) interval discrimination, (3) meter discrimination. A solo performance of each item is presented by phonograph recording. The reliability coefficient is reported as .88 (N = 7,710; SD = 10.41). Validity based on correlation with teacher ratings is .92 (N = 1,893).

The Warner Scale of Social Status contains scales for ratings of the following factors: (1) occupation of parent(s), (2) source of income (not used in this study), (3) house type, (4) dwelling area. Each of the four ratings is assigned a specific weight, then totaled for the final score. The reported multiple intercorrelation coefficient of the factors included in the scale is .972.

IV. RESULTS

The dependent variable, performance achievement on cornet or trumpet, was measured by the Watkins-Farnum Performance Scale. A t-test was employed to determine whether a significant difference existed between the mean scores of the experimental and control groups. Table III shows the result of this calculation.

Table III. Significance of Difference Between Mean Scores of Experimental and Control Groups

Group	N	Mean	S.D.	t
Experimental	27	31.41	19.59	3.6**
Control	25	15.12	12.42	

**Statistically significant at .01 level

The standard deviations revealed greater homogeneity in the control group (raw scores range from 1 to 50) than the experimental group (raw scores range from 4 to 77). The difference in mean scores of the experimental group (programed practice) and the control group (non-programed practice) reached significance at the .01 level. These data indicate that programed practice tends to produce greater performance achievement, as measured by the Watkins-Farnum Performance Scale, than non-programed practice.

For a view of the results from the standpoint of each independent variable, the two-way analysis of variance was used. This procedure tested significance of the following:

1. Main effect - effect of programed practice upon performance achievement.

2. The effect of each independent variable upon performance achievement.

3. Interactions between programed practice and each of the independent variables in terms of performance achievement.

Significance of the three effects, calculated from the standpoint of music achievement (independent variable) is indicated in Table IV.

Table IV. Analysis of Variance of Performance Achievement by Level of Music Achievement and Mode of Practice

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Level of Music Achievement	1	1,788.92	1,788.92	5.56*
Mode of Practice	1	4,266.11	4,266.11	13.33**
Interaction	1	291.00	291.00	.91
Within	48	11,364.82		
Total	51	17,710.85		

*Significant at the .05 level
**Significant at the .01 level

The F value of 13.33 exceeds the .01 level of confidence, indicating the significant difference in terms of performance achievement between programed practice and non-programed practice. Programed practice is again shown to produce superior results. The F value of 5.56 for level of music achievement is significant at the .05 level of confidence. This statistic indicates the difference, in terms of performance achievement, between control group (non-programed practice) members of above-average music achievement and those of below-average music achievement. The result shown is that with non-programed practice, students of above-average music achievement tend to exhibit significantly greater performance achievement than those of below-average music achievement. This finding is supported by a t-test between the two sub-groups yielding a value of 2.71, which is significant at the .05 level and very close to the .01 level of confidence.

Significance of the three effects, calculated from the standpoint of social status, (next independent variable) is shown in Table V.

Table V. Analysis of Variance of Performance Achievement by Level of Social Status and Mode of Practice

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Stat.
Level of Social Status	1	486.20	486.20	1.85
Mode of Practice	1	4,412.41.	4,412.41	16.76**
Interaction	1	540.50	540.50	2.05
Within	48	12,643.22	263.41	
Total	51	18,082.33		

**Significant at the .01 level

The F value of 16.76 greatly exceeds the .01 level of confidence, again indicating the superiority of programed practice over non-programed practice in producing performance achievement. The F value of 1.85 indicates no significant difference in performance achievement between above-average and below-average social status students using non-programed practice. The F value of 2.05 for interaction indicates no significant difference in performance achievement between above-average and below-average social status students using programed practice.

Significance of the three effects, calculated from the standpoint of I.Q. rating, (third independent variable) is indicated in Table VI.

Table VI. Analysis of Variance of Performance Achievement by Level of I.Q. and Mode of Practice

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F Statistic
Level of I.Q.	1	96.92	96.92	.38
Mode of Practice	1	4,266.11	4,266.11	17.07**
Interaction	1	1,350.60	1,350.60	5.40*
Within	48	11,997.21	249.94	
Total	51	17,710.84		

*Significant at the .05 level
**Significant at the .01 level

The F value of 17.07 for mode of practice greatly exceeds the .01 level of confidence and again reaffirms the superiority of programed practice over non-programed practice in producing performance achievement. The F value of .38 for level of I.Q. indicates no significant difference in performance achievement between above-average and below-average I.Q. students using non-programed practice.

The F value of 5.40 for interaction which achieves the .05 level of confidence is of particular interest. A significant difference in performance achievement is denoted between above-average and below-average I.Q. students using programed practice. A glance at Table VII reveals a higher mean score for the below-average I.Q.

Table VII. Means and Standard Deviations of Performance Achievement Scores for I.Q. Sub-Groups

I.Q.	Experimental Group N	Mean	S.D.	Control Group N	Mean	S.D.
Above-Average	14	26.15	17.09	12	19.75	15.15
Below-Average	13	~~42.33~~ 39.08	~~2.26~~ 12.97	13	10.70	7.04

The application of a t-test to these two sub-groups produces a value of 3.51, exceeding the .01 level of confidence. It can be assumed that with programed practice, students of below average I.Q. benefit significantly more than those of above-average I.Q. in obtaining performance achievement. The assumption that with programed practice, below-average I.Q. students will outperform above-average I.Q. students, can be misleading. More research is necessary to justify such an assumption.

Another view of relationships between independent variables and performance achievement, and effects of programed practice is provided through correlations. The coefficients for product-moment correlations between performance achievement and each of the independent variables are presented in Table VIII.

Table VIII. Correlations Between Performance Achievement and Independent Variables

Variable	Correlation Coefficients	
	Control Group	Experimental Group
Music Achievement	.480*	.330
Social Status	-.080	.142
I.Q.	.385*	-.182

*Significant at the .05 level

The correlation coefficients do not differ substantially from control to experimental groups for both music achievement and social status. The coefficients shown for I.Q. are of particular interest. The control group correlation with performance achievement is a significant value of .385; for experimental group it is a nonsignificant value of -.182. The considerable difference between .385 for the control group and -.182 for the experimental group seems to be a result of the significant interaction in terms of cornet performance achievement between I.Q. and programed practice.

Attitudes of the Experimental Group Toward Programed Practice

A questionnaire administered to members of the experimental group revealed the following attitudes:

1. Everyone preferred the programed method of practice to traditional non-programed practice.

2. Eighty-nine percent believed that the lesson material moved rather slowly. This seemed to be more of a reflection upon lesson material than upon format. Lesson material was geared to the progress of the band class as a whole, though programed practice increased the learning speed of the experimental group students.

3. About eighty percent preferred more playing and less listening to verbal explanations.

4. All believed they were profiting by programed practice.

Summary

Hypotheses were tested pertaining to certain outcomes: (1) the effect of programed practice upon performance achievement, (2) the interaction between programed practice and music achievement, social status, and I.Q., (3) the relationship of performance achievement to music achievement, social status, and I.Q.

1. In terms of performance achievement, structured practice with programed material produced a difference as compared with non-programed material. The difference was statistically significant at the .01 level of confidence.

2. Performance achievement of the above-average music achievement sub-group, compared with that of the below-average sub-group showed a difference which was statistically significant at the .05 level of confidence.

3. Interaction between music achievement and programed practice, in terms of performance achievement, was not statistically significant at the .05 level of confidence.

4. Performance achievement of the above-average social status sub-group, compared with that of the below-average social status sub-group, did not show a difference which was statistically significant at the .05 level of confidence.

5. Interaction between social status and programed practice, in terms of performance achievement, was not statistically significant at the .05 level of confidence.

6. Performance achievement of the above-average I.Q. sub-group, compared with that of the below-average sub-group, did not show a difference which was statistically significant at the .05 level of confidence.

7. Interaction between I.Q. and programed practice, in terms of performance achievement, was statistically significant at the .05 level of confidence.

8. Correlation of I.Q. with performance achievement was significant at the .05 level of confidence for the control group, and of negligible significance for the experimental group.

V. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Based upon an analysis of the outcomes of this investigation, the following conclusions are admissible:

1. When beginning instrumentalists practice with lesson material structured in a taped, self-instructional format as described in this study, a substantial increase of efficiency is noted. This efficiency in learning and applying necessary music performance concepts and skills is significantly evident in actual instrumental performance.

2. Students of above-average music achievement exhibit significantly greater performance achievement than students of below-average music achievement. When programed practice is included, however, students of above-average music achievement exhibit no significant difference in performance achievement from students of below-average music achievement. It may be assumed that above-average music achievement is not necessary for performance achievement when program practice is used.

3. There is no significant difference in performance achievement between students of above-average and below-average social status. The inclusion of programed practice causes no significant difference.

4. With students using the conventional non-programed mode of practice there is no significant difference in performance achievement between those of above-average I.Q. and those of below-average I.Q. With students using the programed mode of practice those of below-average I.Q. seem to exhibit greater performance achievement than those of above-average I.Q. It may be assumed that with programed practice, above-average I.Q. is not necessary for performance achievement. In fact, students of below-average I.Q. may exhibit equal or greater performance achievement than those of above-average I.Q.

5. There is a positive relationship between I.Q. and performance achievement. However, almost no relationship exists between I.Q. and performance achievement when programed practice is used. This may be attributed to the significant interaction between I.Q. and programed practice in terms of performance achievement.

Implications of Programed Practice

The adoption of a programed method of individual practice, such as the format described in this study, could have the following implications for instrumental music education:

1. More efficient, rapid growth in performance achievement - with above-average I.Q. and especially below-average I.Q. students.

2. Higher level of performance for elementary instrumental groups.

3. More class time can be devoted to rehearsal, and less time devoted to correction of individual problems caused by inefficient practice.

4. Pinkerton reports that instructors rely heavily upon music achievement and I.Q. ratings as criteria for selection of instrumental students. Students no longer need be rejected on the basis of that criteria. With programed practice, a student of below-average I.Q. or music achievement can achieve comparatively as well in performance as the student who is above-average in those areas. It is recognized that a certain minimum level in music achievement and I.Q. is required for performance achievement.

5. Frustration of better students with slow group progress can be eliminated, thus reducing drop-out percentage.

6. Discouragement of students of below-average I.Q. or music achievement, can be eliminated, thereby reducing drop-out percentage.

7. Greater performance achievement of students may beget higher standards as consumers of music.

8. Outcomes of this study may occur at other levels of instrumental study with older students.

Recommendations

1. In view of this study, a similar investigation to include subjects of lower I.Q. and music achievement is recommended. Such an investigation may determine the minimum levels of I.Q. and music achievement necessary for meaningful performance achievement - with and without programed practice.

2. A similar study should be made at other levels of instrumental study to determine whether the effects of programed practice hold true at all ages and levels of instrumental study.

3. A study should be made of the interaction between programed practice and I.Q. A comparison should be made between linear and branched techniques of programed practice in terms of this interaction.

4. A study should be made investigating reasons for the interaction between I.Q. and programed practice.

SELECTED REFERENCES

1. Spohn, Charles L. "An Exploration in the Use of Recorded Teaching Material to Develop Aural Comprehension in College Music Classes." Unpublished Doctoral dissertation, Ohio State University, 1959.

2. Spohn, Charles L. "Programming the Basic Materials of Music for Self-Instructional Development of Aural Skills," Journal of Research in Music Education, XL, No. 2 (Fall, 1963), 91-98.

3. Carlsen, James C. "An Investigation of Programmed Learning in Melodic Dictation by Means of a Teaching Machine Using a Branching Technique of Programming." Unpublished Doctoral dissertation, Northwestern University, 1962.

4. Sidnell, Robert G. "The Development of Self-Instructional Drill Materials to Facilitate the Growth of Score Reading Skills of Student Conductors." Final reports to U.S. Department of Health, Education and Welfare, Office of Education, Bureau of Research, Washington, 1968.

5. Kanable, Betty. "An Experimental Study Comparing Programed Instruction with Classroom Teaching of Sight-Singing," Journal of Research in Music Education, XVII, No. 2 (Summer, 1969), 217-226.

6. La Bach, Parker. "Pilot Project for Development of a Device to Facilitate Learning of Basic Musical Skills." Progress report submitted to the Department of Health, Education and Welfare, Co-operative Research Branch, Washington, 1966.

7. Deihl, Ned C. and Rudolf Radocy. "Computer-Assisted Instruction: Potential for Instrumental Music Education," Council for Research in Music Education, Bulletin No. 15 (Winter, 1969), 2-7.

8. Puopolo, Vito. "The Structuring of Practice Materials on Tape." Unpublished pilot study, Michigan State University, 1966.

9. Puopolo, Vito. "The Development of Materials for the Structuring and Programming of Individual Practice of Beginning Instrumentalists." Unpublished pilot study, Alcorn A. & M. College, 1968.

10. Pinkerton, Frank W. "Talent Tests and Their Application to the Public School Program, " Journal of Research in Music Education, XL, No. 1 (Spring, 1963), 75-80.

11. Porter, Douglas. "Some Effects of Year Long Teaching Machine Instruction." Automatic Teaching: The State of the Art, pp. 85-90. ed. Eugene Galenter. New York: John Wiley & Sons, Inc., 1963.

12. Colwell, Richard. Elementary Music Achievement Test. Follett Publishing Company, 1967.

13. Warner, W. Lloyd, Marchie Meeker, and Kenneth Eells, Social Class in America: A Manual of Procedure for the Measurement of Social Status. New York: Harper and Brothers, 1960.

14. Otis, Arthur S. The Beta Test for Grades 4-9. New York: World Book Co., 1954.

15. Watkins, John G. and Farnum, Stephen. Watkins-Farnum Performance Scale. Winona, Minnesota: Hal Leonard Music, Inc., 1954.

APPENDIX A

The following is the script of an excerpt from a practice tape:

"Turn to page 29, number 171. As we perform this for you, notice the 8th rests. Ready, listen." (model performance)

"Did you notice that when the 8th rests occurred, they were on the 'and' of the beat? Pay close attention as we perform measures 1 and 2 slowly. Ready, listen." (model)

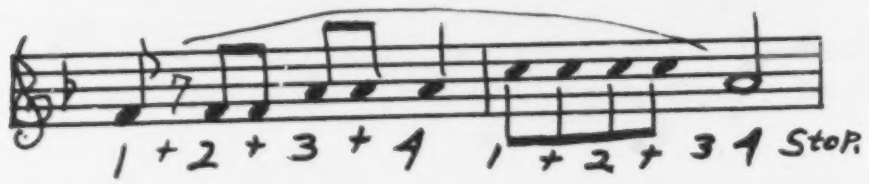
"Now you play it; ready, play." (response, slow) "Again, ready, play." (response, slightly faster) "Again, ready, play." (response, faster) "Again, ready, play." (response, a tempo) "Did you sound like this? Ready, listen." (reinforcement)

"Now measures 3 and 4; ready, listen." (model)

"Now you play it; don't forget the Bb. Ready, play." (response, slow) "Again, ready,

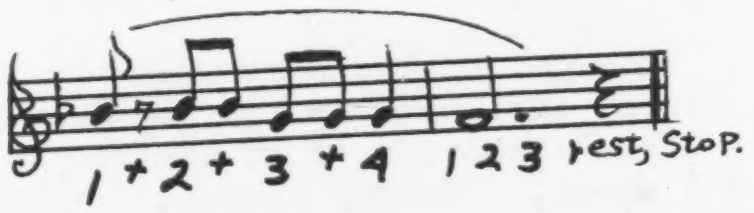
play." (response, slightly faster) "Again, ready, play." (response, faster) "Again, ready, play." (response, a tempo) "You should have sounded exactly like this: Ready, listen." (reinforcement)

"The rhythm is slightly different for measures 5 and 6. Ready, listen." (model)



"Now you play it; ready, play." (response, slow) "Again, ready, play." (response, slightly faster) "Again, ready, play." (response, faster) "Again, ready, play." (response, a tempo) "Did you sound exactly like this? Ready, listen." (reinforcement)

"Now measures 7 and 8; ready, listen." (model)



"Now you play it; don't forget the Bb. Ready, play." (response, slow) "Again, ready, play." (response, slightly faster) "Again, ready, play." (response, faster) "Again, ready, play." (response, a tempo) "You should have played it exactly like this: Ready, listen." (reinforcement)

"Now you play it all the way through from the beginning; ready, play." (response) "Now play it together with our trumpet player; see if you are doing everything exactly as he is." (response-reinforcement)

APPENDIX B

TABLE IX

RAW SCORES AND DATA

Experimental Group					Control Group				
Student Number	Music Achievement	Social Status	I.Q.	Performance Achievement	Student Number	Music Achievement	Social Status	I.Q.	Performance Achievement
Sub-Group 1: High MA., High SS., High I.Q.									
1	65	14	115	17	1	65	20	128	22
2	75	14	139	31	2	65	19	116	10
3	66	18	125	5*	3	66	23	118	50
4	77	23	115	77	4	63	20	112	17
5	65	14	128	55					
6	66	17	122	10					
Sub-Group 2: High MA., Low SS., Low I.Q.									
7	65	36	97	52	5	64	31	110	26
8	63	27	102	70	6	70	33	106	19
9	66	28	105	23	7	69	25	90	8
Sub-Group 3: High MA., High SS. Low I.Q.									
10	69	14	100	31	(Did not complete the experiment)				
11	61	14	109	63					
12	65	13	108	31					
Sub-Group 4: High MA., Low SS., High I.Q.									
13	74	27	119	30	8	67	35	121	37
14	64	27	116	4	9	59	27	119	45
15	68	27	115	25					
16	63	27	118	7					

TABLE IX (Continued)

Experimental Group					Control Group				
Student Number	Music Achievement	Social Status	I.Q.	Performance Achievement	Student Number	Music Achievement	Social Status	I.Q.	Performance Achievement
Sub-Group 5: Low MA., High SS., High I.Q.									
17	42	20	112	18	10	50	23	118	15
18	47	23	125	31	11	51	18	124	15
					12	52	14	119	9
(Did not complete the experiment)					13	56	23	125	8
					14	55	23	125	1
Sub-Group 6: Low MA., High SS., Low I.Q.									
19	58	16	108	63	16	52	17	106	14
20	45	20	87	32	17	58	21	110	17
21	49	18	109	41	18	50	20	106	3
					19	50	14	89	2
Sub-Group 7: Low MA., Low SS., High I.Q.									
22	56	27	115	17	(Did not complete the experiment)				
23	50	27	112	13					
Sub-Group 8: Low MA., Low SS., Low I.Q.									
24	50	40	102	24	20	49	27	101	4
25	41	37	108	28	21	54	31	96	6
26	45	31	94	29	22	39	30	100	14
27	54	27	102	21	23	42	31	110	8
					24	46	27	106	14
					25	51	31	105	5

*This student had a physical handicap impeding performance achievement - discovered after data analysis.

APPENDIX C

TABLE X

SUMS AND TOTALS FOR MUSIC ACHIEVEMENT SUB-GROUPS

	Experimental	Control	Total
Above Mean	X = 531 X^2= 25,943 N = 16	X = 234 X^2= 7,868 N = 9	X = 765 N = 25
Below Mean	X = 317 X^2= 11,059 N = 11	X = 143 X^2= 1,699 N = 16	X = 460 N = 27
Total	X = 848 N = 27	X = 377 N = 25	X =1225 N = 52

TABLE XI

SUMS AND TOTALS FOR SOCIAL STATUS SUB-GROUPS

	Experimental	Control	Total
Above Mean	X = 505 X^2= 24,179 N = 14	X = 182 X^2= 4,466 N = 14	X = 687 N = 28
Below Average	X = 342 X^2= 12,794 N = 13	X = 186 X^2= 5,028 N = 11	X = 528 N = 24
Total	X = 847 N = 27	X = 368 N = 25	X = 1215 N = 52

TABLE XII

SUMS AND TOTALS FOR
I.Q. SUB-GROUPS

	Experimental	Control	Total
Above Mean	X = 340	X = 237	X = 577
	X^2= 13,662	X^2= 7,345	
	N = 14	N = 12	N = 26
Below Mean	X = 508	X = 140	X = 648
	X^2= 23,340	X^2= 2,132	
	N = 13	N = 13	N = 26
Total	X = 848	X = 377	X = 1225
	N = 27	N = 25	N = 52

MUSIC ACHIEVEMENT TEST
TEST ONE

Description of Test 1

40

Test 1,* of the *Music Achievement Tests*, provides standardized and diagnostic data on three musical skills: (1) pitch discrimination, (2) interval discrimination, and (3) meter discrimination. None of these three parts requires any skill in music reading, but, rather, requires responses based on auditory tasks.

Part 1—Pitch Discrimination
  Subtest a (Two Tones)
  Subtest b (Three Tones)
Part 2—Interval Discrimination
  Subtest a (Three-Tone Patterns)
  Subtest b (Phrases)
Part 3—Meter Discrimination
  (Duple and Triple meter)

*Artists used on the recording were string players from the Chicago Symphony Orchestra: Karl Fruh, cello; and Sol Bobrov, violin. Dr. Ruth Crockett was pianist.

Part 1 — Pitch Discrimination

General Discussion

Pitch discrimination—the ability to determine which musical tones are higher and which are lower—is one of the most fundamental musical skills. Without this skill, instructional communication in music would be greatly hampered, if not impossible, both in the area of appreciation and in the area of performance. The teacher trained in music may feel that pitch discrimination is so obvious that pupils of school age already possess the ability to tell higher from lower. Such an assumption is false, however; the research of Repina and others with three-, four-, and five-year-old children shows that the skill is a learned response, seemingly acquired easily by some pupils but for others requiring specific learning activities and repeated practice. This fact is corroborated by the daily experiences of thousands of elementary music teachers. Work in the development of this part of the test indicated that many students reach sixth-grade level without acquiring this basic skill.

Pitch Discrimination is placed first in MAT to reflect its fundamental role in music achievement. Since it is the easiest part of the test, it can serve to give pupils a feeling of security and to put them at ease for the other two parts of Test 1.

In *Subtest a*, the half-step was selected as the smallest interval because it is basic to the tonal patterns commonly found in the instructional program. When pitch discrimination is taught in the early stages of music instruction, instruments such as the piano (where the smallest interval is the half-step) are the usual teaching media. Discrimination of pitch with less than half-step intervals is more difficult and becomes important when the emphasis is on performance activities. In arriving at the present version of the subtest, the author tried questions containing all possible combinations of half-step intervals as well as larger intervals. (For a complete discussion, see the MAT Interpretive Manual.) In this subtest, test items in which both pitches are the same are easy and have low discriminating power, but are included to make the three-choice answer possible. The discriminating power of the other items is thus greatly increased over that offered by a two-choice answer.

Subtest b was developed to measure pitch discrimination in a context closer to that of the actual musical situation. Beyond simple comparison, the listener must also retain a previous pitch

(tonal memory) with which to make his comparison, and in this respect he practices the same skill used in performing or in listening. In performing, the pupil often returns to the same tone after an interval of one or two tones; he needs to retain the first pitch for accuracy of intonation and for proper phrasing. In listening, he organizes his entire concept of the melody and harmony by retaining certain pitches and relating the music to them, so that he recognizes tonality, themes and motifs, repetition, and alternation or variety within the music, and thus "makes sense" out of it.

The larger number of possibilities for construction of test items allowed by the addition of the third note makes this subtest more powerful than *Subtest a* in its discriminations. However, preliminary experiments with the test showed that many of the more skilled pupils were able to obtain maximum scores on this part as well. One seemingly important factor was rejected after preliminary trials as having little effect on the test. This was the factor of which pitch to listen for—highest or lowest. Although most of the pupils and the teachers used in preliminary trials of *Subtest b* expressed a strong preference for a particular way, the preferences were nearly equally divided between selecting highest or lowest pitch. Scores showed no differences in difficulty between the two ways. Therefore, selection of the lowest pitch was arbitrarily decided upon for use in this subtest.

35

***Subtest a** (Two Tones)*
This subtest is composed of 15 items. In each item the pupil is required to listen to two tones and to determine which tone is higher, or whether the tones are the same. The pupil answers each question by filling in a blank marked 1, 2, or S (first tone higher, second tone higher, or the tones the same).

***Subtest b** (Three Tones)*
This subtest is composed of 10 items. In each item the pupil is required to decide which of three tones played is the lowest. This requires the same skill as does the two-tone subtest, but is made more complex by the addition of a third [illegible]e. Some items require the pupil to compare tone 1 with tone 2, and then tone 2 with tone 3. Other items require the comparison of tones 1 and 3 (2 obviously not the answer and acting as a distractor). In this latter case, *tonal memory* is necessary if the pupil is to retain accurately the sound of the first tone so that he can compare it with tone 3. Answers are made by filling in blanks 1. 2. or 3.

Part 2 — Interval Discrimination

General Discussion
The Interval Discrimination part of Test 1 is related to Pitch Discrimination (Part 1), but measures a distinctly different skill—that is, recognition of distance between pitches. Knowledge of absolute intervals such as third, fifth, seventh, and second appears to be less fundamental and less useful than recognition of intervals that are scalewise and those that leap. An awareness of scalewise or leaping movement in music which is sung, played, or listened to is essential for a complete understanding of the music and is requisite to verbalization about music and musical patterns. Thus, it is necessary in all teaching situations where the teacher communicates with pupils about specifics in music.

Subtest a (Three-Tone Patterns) presents interval questions in the simplest form possible. The three-tone pattern was deemed easier than a two-tone pattern, for the additional tone gives the pupil one more comparison to help him decide upon the nature of the intervals, without taxing his tonal memory. This portion of the test is useful for diagnostic purposes since failure to achieve in this area strongly indicates either a lack of understanding of the concept leap-scale, or a lack of experience in making such judgments about music.

Subtest b (Phrases) presents complete phrases from folk songs and art music, the songs being among those common to several series of music textbooks. Familiarity with the songs may give an advantage of some pupils; however, in preliminary testing no evidence of such bias was detected. If the student recalls the selection and any discussion about it one might expect the familiar numbers to have an advantage. This remembering of specifics from the music class is, of course, not undesirable in an achievement test. Extensive testing has shown no evidence of familiarity affecting this subtest in either way. (See the MAT Interpretive Manual for a full discussion of this point.)

Repeated tones are not to be counted in determining whether the music moves scalewise or by leaps. Emphasize this point with students.

If a pupil shows achievement in *Subtest a* but not in *Subtest b* of the Interval Discrimination part, the teacher may infer that the pupil has adequate understanding but needs more practice

to cope with the distractors offered by the melodic test items. Since the subtests are closely related, the two must be considered together in measuring achievement in this area.

***Subtest a** (Three-Tone Patterns)*
This subtest is composed of 10 items. It requires the pupil to listen to one measure of three tones and decide whether all tones are related step by step like a scale or whether a "leap" (or "skip") occurs between any two consecutive tones. The pupil answers by filling in the blank marked S (scalewise), L (leaps), or ? (in doubt).

***Subtest b** (Phrases)*
This subtest is composed of 18 items. It requires that the pupil be able to distinguish music that moves scalewise from that which leaps in a phrase. The pupil decides whether the phrase moves generally in a scalewise manner or generally leaps from one tone to another ignoring repeated tones. Directed experiences in singing and listening should produce this ability within a pupil. Test items are answered similarly to those of *Subtest a*: S (scalewise), L (leaps), or ? (in doubt).

Part 3—Meter Discrimination (Duple and Triple Meter)

General Discussion
Meter, like pitch, is a fundamental of music, for any organization of rhythm is difficult without recognition of basic metric structure. An awareness of meter is essential both in performance and in listening, for the vast bulk of Western music uses a consistent meter as its basis for rhythmic unity and variety. To hear when music changes from a basic two to three, or when the meter is irregular, requires that some feeling for regular pulse be established.

In the preliminary stages of this part of the test, many different items were tried. Simple nonmelodic patterns were played on a rhythm instrument; patterns were developed in the context of scalewise melodies; the metronome was used to indicate the pulse by a series of beats preceding each test item; rhythm instruments such as the wood block, triangle, and drum were added to melodic items to emphasize the pulse; items were preceded by six pulses counted out to indicate tempo. In each case, the procedure proved to be inferior to the one selected. As a result, the final form of this part consists of 15 items, each of which is a phrase taken from a familiar elementary school song, played on the piano, and including a harmonic accompaniment. Pupils are required to distinguish between duple and triple meters. The element of song familiarity enhances this particular test part if the students pay attention to the task at hand. Pupils who know a song well should find it easier to recognize the pulse, to hear the pattern of strong and weak pulses, and to retain the memory of the melody long enough to help in determining the correct answer. However, the results of testing some 30,000 teachers and pupils has indicated that familiarity only to the extent of knowing the song did not affect the results. In other words, students seemingly may know the song but do not know enough about the song, i.e., have not discussed its meter in sufficient detail, to influence the results of this part of the test.

The pupil hears the phrase once, the phrase being of sufficient length that he has time to establish the pulse and then recognize the combination of accented and unaccented pulses as falling into a duple or triple meter. Since the melodies are presented as complete phrases, some of them terminate before the end of the measure, having begun on a pick-up note or notes. This termination in no way interferes with the discriminating power of the items.

Pupils who have had classroom practice in listening for meter will achieve higher scores on this part than will those students who lack experience in this activity. Answers are made by filling in the blanks marked 2 (duple meter), 3 (triple meter), or ? (in doubt).

APPENDIX E

MAKING THE PRIMARY RATINGS

The I.S.C. should normally be based upon ratings on occupation, source of income, house type, and dwelling area.[2] If the data for any one of these four ratings are lacking, the other three should be computed. If the data for two of the four are lacking, no Index should be attempted.

Each of the four status characteristics is rated on a seven-point scale which ranges from a rating of "1," very high status value, to "7," very low status value. These rating scales are presented in very brief form in Table 4. The scales are described in much more detail in Chapter 9; anyone planning to use the I.S.C. should certainly refer to the interpretations, qualifications, and definitions given in that chapter.

In the case of occupation and of house type, two alternate rating plans are available. It is probable that either of the alternate plans may be used with a reasonable expectation of good results. The most complete statistical validation is available for the form which was used in the main analysis of Jonesville, but for both occupation and house type later modifications were introduced which, in the judgment of the present investigators, offer some improvement over the original scales. In some cases, the nature of the data available may suggest a preference for some specific form of rating. It may well be, also, that further investigation will develop still further refinement and improvement of these rating scales, particularly as they are applied to new communities.

SECURING A WEIGHTED TOTAL OF THE RATINGS

The ratings on the separate status characteristics are combined into a single numerical index by assigning to each one a weight and securing a weighted total of the separate ratings. The weights are based on evidence from the Jonesville study and are designed to secure the maximum degree of social-class prediction.[3] When the

[2] See pp. 178-81 for suggestions as to the possible use of scales for amount of income and education as elements in the I.S.C. Before using these two characteristics, however, the reader should read the evidence presented in Chapter 11 as to the relative value of these characteristics for predicting social-class placement.

[3] See Chapter 11 for a description of the derivation of these weights.

data are available for all four of the ratings, the ratings should be multiplied by the following weights.

Occupation	4
Source of Income	3 NOT INCLUDED
House Type	3
Dwelling Area	2

TABLE 4

SCALES FOR MAKING PRIMARY RATINGS OF FOUR STATUS CHARACTERISTICS *

Status Characteristic and Rating	Definition
Occupation: Original Scale	
1.	Professionals and proprietors of large businesses
2.	Semi-professionals and smaller officials of large businesses
3.	Clerks and kindred workers
4.	Skilled workers
5.	Proprietors of small businesses
6.	Semi-skilled workers
7.	Unskilled workers
Occupation: Revised Scale	(See Table 7 on page 149.)
Source of Income	
1.	Inherited wealth
2.	Earned wealth
3.	Profits and fees
4.	Salary
5.	Wages
6.	Private relief
7.	Public relief and non-respectable income
House Type: Original Scale	
1.	Large houses in good condition
2.	Large houses in medium condition; medium-sized houses in good condition
3.	Large houses in bad condition
4.	Medium-sized houses in medium condition; apartments in regular apartment buildings
5.	Small houses in good condition; small houses in medium condition; dwellings over stores
House Type: Original Scale (continued)	
6.	Medium-sized houses in bad condition; small houses in bad condition
7.	All houses in very bad condition; dwellings in structures not intended originally for homes
House Type: Revised Scale	
1.	Excellent houses
2.	Very good houses
3.	Good houses
4.	Average houses
5.	Fair houses
6.	Poor houses
7.	Very poor houses
Dwelling Area	
1.	Very high; Gold Coast, North Shore, etc.
2.	High; the better suburbs and apartment house areas, houses with spacious yards, etc.
3.	Above average; areas all residential, larger than average space around houses; apartment areas in good condition, etc.
4.	Average; residential neighborhoods, no deterioration in the area
5.	Below average; area not quite holding its own, beginning to deteriorate, business entering, etc.
6.	Low; considerably deteriorated, run-down and semi-slum
7.	Very low; slum

* The more extended description of these categories and qualifications as to their use contained in Chapter 9 should be read by anyone undertaking to make actual ratings of these characteristics.

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WATKINS-FARNUM PERFORMANCE SCALE

FORM A

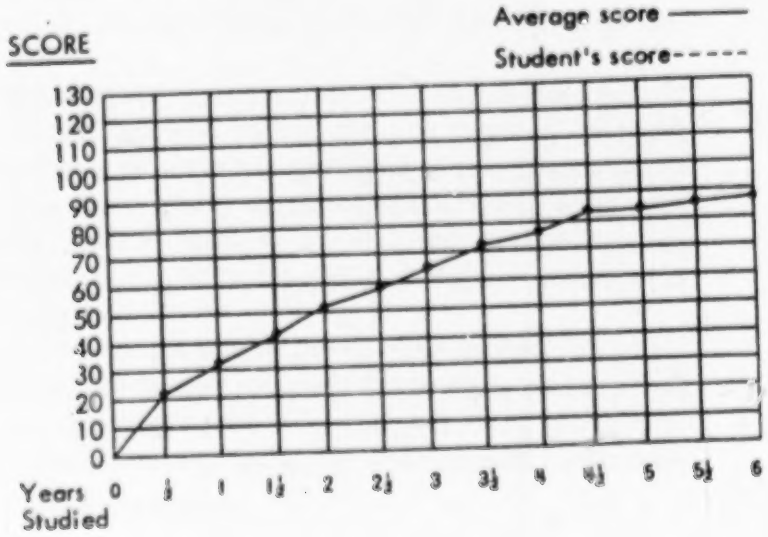
Score Sheet For B♭ Cornet, Clarinets, Baritone 𝄞

Name _____Date _____

Instrument _____Years Studied ___

School _____Grade ____Age ___

PROGRESS CHART



SCORING SUMMARY

(Student's score is "possible score" less errors)

Ex.	1.	Possible score	13	Errors		Score		
	2.	"	"	10	"		"	
	3.	"	"	10	"		"	
	4.	"	"	10	"		"	
	5.	"	"	10	"		"	
	6.	"	"	10	"		"	
	7.	"	"	10	"		"	
	8.	"	"	10	"		"	
	9.	"	"	10	"		"	
	10.	"	"	10	"		"	
	11.	"	"	10	"		"	
	12.	"	"	15	"		"	
	13.	"	"	9	"		"	
	14.	"	"	10	"		"	

GRADE ☐ TOTAL SCORE ☐

Remarks _____

_____

GRADING CHART

GRADES FOR CORNET CLARINET BARITONE												
Years	½	1	1½	2	2½	3	3½	4	4½	5	5½	6
A	35	50	62	70	77	83	88	90	92	94	96	98
B	25	40	48	55	61	66	70	74	78	82	84	86
C	15	30	35	40	45	50	54	58	62	65	67	69
D	5	15	25	30	35	40	44	47	50	52	54	56

Sample—At the end of one year if the score of a clarinet player is 50 or higher the grade will be A. At the end of one year a score of between 30 and 39 will earn a horn player a B.

Errors may be indicated in two ways:

1. Draw a cross through the incorrect measure.
2. Indicate the type of error by using the symbols on page 4 and 5.

Pitch	P	Change of tempo	T
Time	R	Expression	E
Slur	S	Holds or pauses	R
Rest	R	Repeats	:‖

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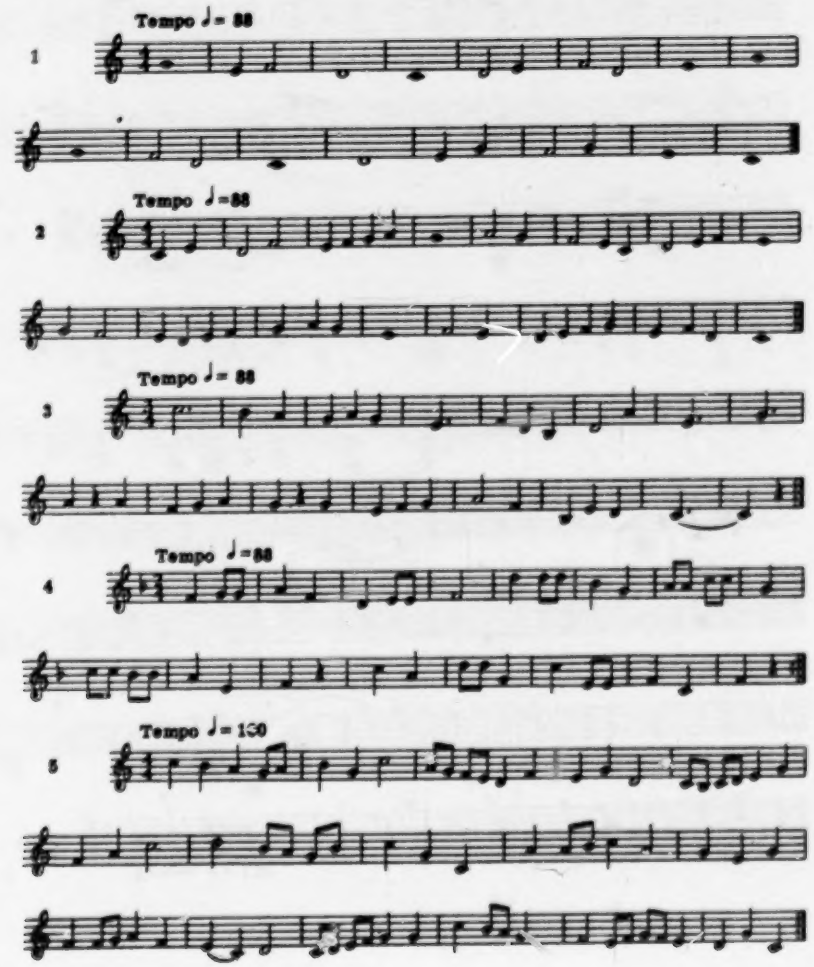
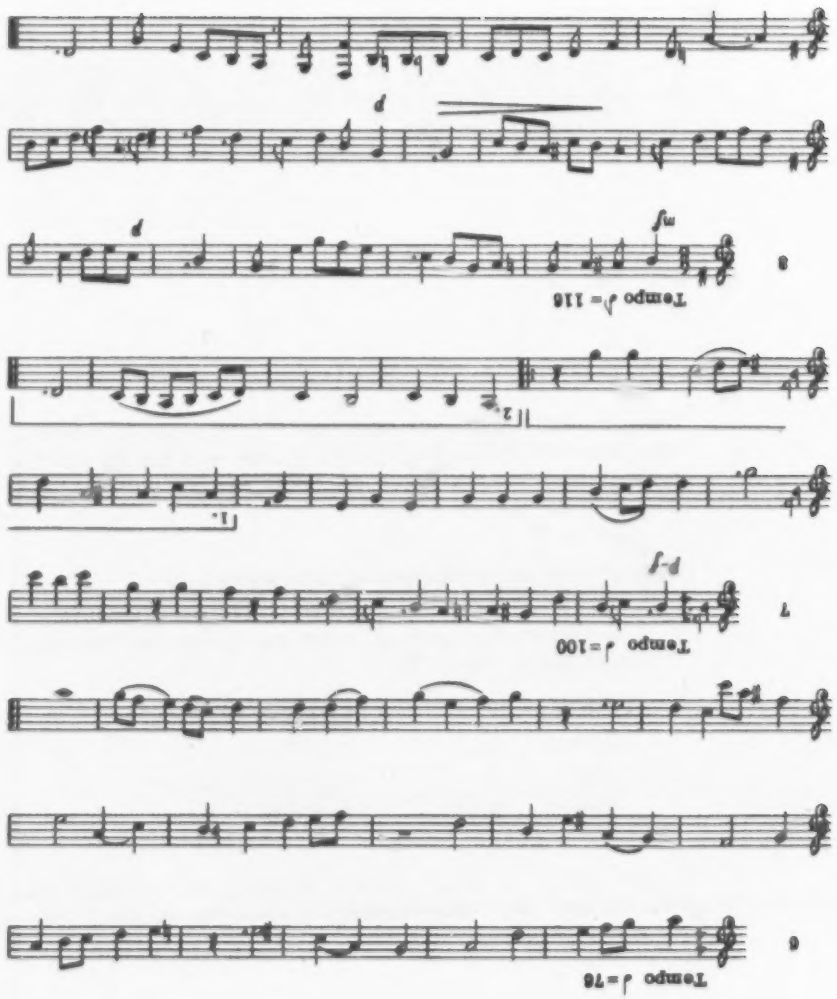
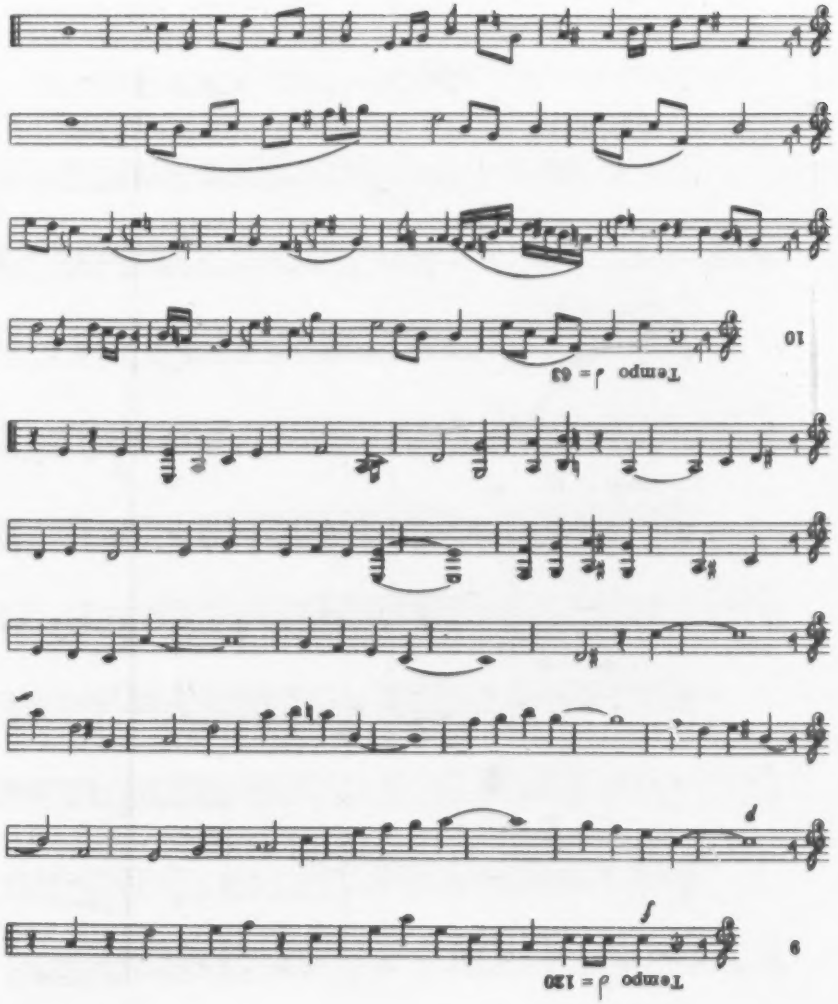
Test begins here: Check only one error per measure.

Note: In order to keep the number of score sheets to a minimum two groups of instruments are combined on this sheet. The example below is for Clarinet. Other instruments will obviously play the lower octave or certain passages as written in the test book.

WATKINS-FARNUM PERFORMANCE SCALE EXERCISES




Tempo ♩= 116
Tempo ♩=100
Tempo ♩= 76


Tempo ♩= 63
Tempo ♩= 130

11 Tempo ♩ = 100

12 Tempo ♩. = 132

13 Tempo ♩ = 100

14 Tempo ♩. = 80

APPENDIX G

STUDENT ATTITUDE

A. The practice tpaes contained:

1. Too much talking
2. Just the right amount of listening and playing
3. Too much listening, not enough playing
4. Too much explaining
5. Not enough explaining
6. Just the right amount of everything

B. The taped lesson:

1. Moved too fast
2. Moved too slow
3. Moved at just the right pace

C. Would you like to have the practice tapes changed in any way?

1. Yes
2. No

a) If your answer is yes, in what way would you like to have the practice tapes changed?

_____

_____

_____

_____

_____